PROPHYLAXIS AND TREATMENT
of
WHOOPING-COUGH

VACCINES PREPARED BY
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WHOOPING-COUGH

HISTORICAL: It has been conclusively proven* that the specific causative agent of whooping-cough (pertussis) is the Bordet bacillus, discovered by Bordet and Gengou. Early in the course of the disease, this bacillus is present in large numbers; but research work has demonstrated that the influenza bacillus and the pneumococcus are almost constantly present with the Bordet bacillus. After the first week of the disease, these organisms outgrow the Bordet bacillus and become the chief infecting agents, the presence of which favors the development of broncho-pneumonia. The reports of clinicians in regard to the use of Pertussis Vaccines have not been numerous, but they have been invariably favorable and have proven conclusively the value of vaccine therapy in this disease. Further, the reports have always shown absolute freedom from harmful effects, even in very young babies.

PROPHYLAXIS.

While the use of a vaccine for prophylaxis against whooping-cough is rather recent†, nevertheless it has already attained a place for itself in immunology and has demonstrated the sound basis of immunizing against the disease. Children in families in which other members are suffering from whooping-cough, or those who are otherwise liable to exposure, should be given immunizing doses of Pertussis Vaccine prepared from the Bordet bacillus. The immunity is of uncertain duration, but probably lasts for at least six months.

DOSAGE: Three doses of Pertussis Vaccine are given at intervals of seven days. The initial dose contains 25 million bacteria (dilution No. 1); the second, 50 million (dilution No. 2); and the third, 100 million (dilution No. 3).

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*Mallory & Horner: Journal Medical Research, November, 1912, and March, 1913.

†Sill: American Medicine, June, 1913.

TREATMENT.

In the treatment of whooping-cough, the use of Pertussis Combined Vaccine very materially diminishes the severity and number of the paroxysms and the amount of vomiting, and shortens the course of the disease; many severe cases have entirely subsided under this form of treatment within four weeks after the institution of vaccine therapy.* No harmful effects have been noted; freedom from complications being one of the favorable effects of the treatment. In the published reports, the youngest child treated was one month old and the oldest eight years of age.

DOSAGE: Pertussis Combined Vaccine is usually given every second day, but some clinicians now advise, especially in severe cases, that the doses be administered daily. The practitioner must be guided mostly by the number and severity of the paroxysms, in giving the vaccine. It is recommended that doses of 75 to 600 million (one-half of dilution No. 1 to dilution No. 3) be given every two or three days, according to the age of the child and the severity of the disease. It is advisable, especially in babies and young children, to administer a small initial dose—75 million—(one-half of dilution No. 1) which may be gradually or rapidly increased as symptoms indicate. According to the published reports, it seems perfectly safe to give an initial dose of 150 million (dilution No. 1) to a child over two years of age, the subsequent doses being made larger according to the requirements of the individual case. Clinical results seem to indicate that the vaccine given in fairly large or ascending doses brings about a more rapid cure than smaller doses of constant size.

DILUTIONS.

For Prophylaxis: Pertussis Vaccine is supplied in three dilutions containing respectively 25 million, 50 million and 100 million killed bacteria.

For Treatment: Pertussis Combined Vaccine is supplied in five dilutions, as follows:

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*Sill: American Journal Diseases of Children, May, 1913.

No. 1 contains (150 million)
25 Million B. Pertussis (Bordet)
25 Million B. Influenzae
25 Million Pneumococci
25 Million Streptococci
50 Million Staphylococci (albus and aureus mixed)

No. 2 contains (300 million)
50 Million B. Pertussis (Bordet)
50 Million B. Influenzae
50 Million Pneumococci
50 Million Streptococci
100 Million Staphylococci (albus and aureus mixed)

No. 3 contains (600 million)
100 Million B. Pertussis (Bordet)
100 Million B. Influenzae
100 Million Pneumococci
100 Million Streptococci
200 Million Staphylococci (albus and aureus mixed)

No. 4 contains (1200 million)
200 Million B. Pertussis (Bordet)
200 Million B. Influenzae
200 Million Pneumococci
200 Million Streptococci
400 Million Staphylococci (albus and aureus mixed)

No. 5 contains (2400 million)
400 Million B. Pertussis (Bordet)
400 Million B. Influenzae
400 Million Pneumococci
400 Million Streptococci
800 Million Staphylococci (albus and aureus mixed)

THE VACCINE TREATMENT OF WHOOPING-COUGH*

E. MATHER SILL, M.D.

Attending Physician Diseases of Children, Good Samaritan Dispensary;
Lecturer Diseases of Children, New York Polyclinic Medical
School and Hospital.
NEW YORK.

Thirty-three cases of whooping-cough were treated with the pertussis vaccine, and in all the effect of the vaccine was to diminish markedly the number and severity of the paroxysms and the amount of vomiting.

Absolutely no untoward effects from the use of the vaccine were noted. There were no complications in the cases in which the vaccine was used. No abscess formation, or even slight temporary inflammation or swelling at the site of the injection, and no general constitutional symptoms occurred. The longest time any of the children coughed was twelve weeks and four days. The longest time any child coughed after it was put under vaccine treatment was nine weeks and one day, the average length of time being four and one-half weeks. The injections were given every two or three days in most of the severe cases, and in the very severe cases every day for a few days, until the symptoms were relieved; the milder cases did not receive the vaccine so often nor so much at a time.

In giving the vaccine I was guided more by the severity of the disease than by the age of the child. The youngest child treated was 1 month old and the oldest was 6 years. Most of the children were from 6 months to 3 years of age.

The cases that were seen early in the attack, before the paroxysms had attained their height, seemed to respond more quickly to treatment and their course was shorter. In all cases, however, after one to three injections, the number and severity of the paroxysms was markedly lessened.

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*Reprinted from American Journal of Diseases of Children, May, 1913, and American Medicine, June 1913.

Some children seemed to respond better to treatment than others, and I attribute this to the fact that the dosage was given irrespective of the age; therefore, the younger children got a larger dose proportionately, and as a rule these latter were the ones that responded most quickly to the vaccine and had the shortest attacks after treatment was begun. This fact is important, since (heretofore) these young babies are so apt to have pneumonia complicating or accompanying pertussis, with fatal results.

It was found that the children did better when the vaccine was given in moderately large doses at frequent intervals of one or two days. The vaccine is given under antiseptic precautions, subcutaneously, with the ordinary glass syringe, the injection being given in the abdomen or buttocks.

A very interesting fact is that prophylactic treatment was instituted by giving immunizing doses of pertussis vaccine to children in a family in which one of the children was under treatment for whooping-cough. These children were watched over a period of two months and, although they had never had whooping-cough and were constantly exposed to the disease, did not contract it. It would seem, then, that the vaccine confers immunity to the child injected with small doses.

When we consider how many of these cases of whooping-cough drag on for weeks or months and how many cases in infants terminate fatally from complications, it is not too much to say that the vaccine treatment of this disease should ever be in our minds, and should be given a fair and thorough trial and should also be given as a prophylactic measure to immunize children exposed.

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In my first paper I gave a synopsis of thirty-three cases of whooping-cough treated entirely with pertussis vaccine; since then I have added thirteen more cases to my list of cures. Besides

Synopsis of Cases Treated with Pertussis Vaccine

Case No.	Age	Month of Year Sick	Duration Before Vaccine	Cough		Vomiting		Duration Disease After Vaccine
				Day	Night	Day	Night	
1	4 weeks	June	1 week, 5 days	24	23	Yes	Yes	4 w'ks, 1 day
2	3 years	June	4 weeks	20	20	Yes	Yes	4 w'ks, 3 days
3	7 months	June	5 wks., 3 days	30	30	Yes	Yes	5 w'ks, 1 day
4	8 months	June	3 days	10	7	No	No	5 weeks
5	5 years	June	....	20	12	No	No	5 w'ks, 4 days
6	3 years	June	3 weeks	8	4	No	No	5 w'ks, 1 day
7	4 years	Mch., Apr., May	3 w'ks, 3 days	6	10	No	No	9 w'ks, 1 day
8	4 years	Sept., Oct.	2 w'ks, 3 days	12	12	Yes	Yes	4 w'ks, 1 day
9	1 year	Aug., Sept., Oct.	3 weeks	8	5	Yes	Yes	7 w'ks, 3 days
10	3 years	Sept., Oct.	2 weeks	8	16	Yes	Yes	3 w'ks, 3 days
11	2 years	Aug., Sept.	1 week	8	12	No	No	5 w'ks, 4 days
12	14 months	Sept., Oct.	....	12	16	Yes	Yes	3 w'ks, 2 days
13	30 months	Sept., Oct.	2 weeks	9	12	No	No	6 w'ks, 3 days
14	8 months	Sept., Oct.	2 weeks	12	9	Yes	Yes	4 w'ks, 1 day
15	6 years	March, April	....	2	10	Yes	Yes	5 w'ks, 4 days
16	30 months	February	7 weeks	6	4	Yes	Yes	7 days
17	20 months	March	....	12	6	Yes	Yes	8 days
18	9 months	April, May	....	20	12	Yes	Yes	5 w'ks, 3 days
19	24 months	April, May	....	6	6	No	No	3 w'ks, 4 days
20	7 months	May, June	....	12	3	Yes	Yes	2 w'ks, 1 day
21	2 months	March	5 weeks	3	2	Yes	Yes	3 w'ks, 3 days
22	30 months	March	5 weeks	4	3	Yes	Yes	3 w'ks, 1 day
23	4 years	March	4 weeks	24	24	Yes	Yes	3 w'ks, 1 day
24	3 years	Jan., Feb.	5 weeks	12	24	Yes	Yes	4 w'ks, 4 days
25	2 years	Jan., Feb.	4 weeks	24	4	Yes	Yes	2 w'ks, 3 days
26	4 years	April, May	4 weeks	12	4	Yes	Yes	3 weeks
27	6 years	January	2 weeks	6	2	Yes	Yes	1 week, 3 days
28	3 years	Jan., Feb.	5 weeks	8	5	Yes	Yes	3 w'ks, 6 days
29	2 years	May, June, July	2 weeks	8	6	Yes	Yes	6 w'ks, 5 days
30	1 year	May, June	2 weeks	6	4	Yes	Yes	2 weeks
31	1 year	July	6 weeks	20	24	Yes	Yes	4 weeks
32	3 years	May, June	5 weeks	6	12	Yes	Yes	4 weeks
33	3 years	Jan., Feb.	5 weeks	12	24	Yes	Yes	4 w'ks, 4 days
34	5 months	Feb., March	1 week, 12 con.	30	30	No	No	3 w'ks, 3 days
35	3½ years	March, April	1 month	24	24	Yes	Yes	4 w'ks, 3 days
36	5 years	March, April	1 month	24	24	No	No	2 w'ks, 6 days
37	3 years	March, April	1 week	26	26	Yes	Yes	3 w'ks, 6 days
38	7 months	March, April	2 weeks	10	10	Yes	Yes	3 w'ks, 3 days
39	4½ years	March, April	4 weeks	28	28	Yes	Yes	3 w'ks, 3 days
40	16 months	March, April	1 month	14	14	Yes	Yes	3 w'ks, 2 days
41	4½ years	April, May	1 week	24	10	No	No	2 w'ks, 1 day
42	3½ years	April, May	2 weeks	24	14	Yes	Yes	2 w'ks, 5 days
43	1¾ years	March, April	1 month, 1 w'k	24	24	Yes	Yes	3 weeks
44	3 years	May	....	4	4	No	No	1 week
45	8 years	May	2 weeks	5	5	No	No	3 weeks
46	5 years	May	2 weeks	6	6	No	No	5 weeks

these cases, three children (who had not had whooping-cough) in the families where other members were having the disease and being treated for it, were given prophylactic doses of the vaccine. These children being constantly exposed were watched over a period of two months and did not develop the disease.

The original pertussis vaccine contained the bacillus pertussis alone and this was given to thirty-six of my cases, while the remaining ten cases (forty-six in all, not including the children that were given the vaccine for prophylaxis) received the combined pertussis vaccine.

The average length of time it has taken to cure whooping-cough with the best drug treatment at our command has been from seven to twelve weeks. The average length of time in my first series of thirty-three cases treated with pertussis vaccine alone was four and one-half weeks, and in this series I now believe that the course of many of the cases treated could have been shortened had larger doses of the vaccine been given at more frequent intervals.

My last series of ten cases (number 35 to 46) were treated with the combined vaccine and the average duration of the attack after vaccine treatment was begun was about three and one-half weeks, as will be seen by the appended table, while in some of the cases the duration was shorter. All the cases treated by means of the vaccine have been complete cures.

In closing I wish to say that I am fully convinced from my past experience that the vaccine treatment of whooping-cough is by far the best treatment that we have at our command for the disease, and that not only does it alleviate symptoms and cure the disease quickly but also in a measure prevents those complications of the disease that are apt to be so fatal.

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